



Global trends in emerging infectious diseases

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Abstract:

Emerging infectious diseases (EIDs) are a significant burden on global economies and public health. Their emergence is thought to be driven largely by socio-economic, environmental and ecological factors, but no comparative study has explicitly analysed these linkages to understand global temporal and spatial patterns of EIDs. Here we analyse a database of 335 EID 'events' (origins of EIDs) between 1940 and 2004, and demonstrate non-random global patterns. EID events have risen significantly over time after controlling for reporting bias, with their peak incidence (in the 1980s) concomitant with the HIV pandemic. EID events are dominated by zoonoses (60.3% of EIDs): the majority of these (71.8%) originate in wildlife (for example, severe acute respiratory virus, Ebola virus), and are increasing significantly over time. We find that 54.3% of EID events are caused by bacteria or rickettsia, reflecting a large number of drug-resistant microbes in our database. Our results confirm that EID origins are significantly correlated with socio-economic, environmental and ecological factors, and provide a basis for identifying regions where new EIDs are most likely to originate (emerging disease 'hotspots'). They also reveal a substantial risk of wildlife zoonotic and vector-borne EIDs originating at lower latitudes where reporting effort is low. We conclude that global resources to counter disease emergence are poorly allocated, with the majority of the scientific and surveillance effort focused on countries from where the next important EID is least likely to originate.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Extreme Weather Event, Precipitation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

General Geographical Feature

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Airborne Disease, General Infectious Disease, Vectorborne Disease, Zoonotic Disease

Airborne Disease: Tuberculosis, Other Airborne Disease

Airborne Disease (other): SARS

Vectorborne Disease: General Vectorborne, Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Zoonotic Disease: General Zoonotic Disease, Nipah Virus, Other Zoonotic Disease

Zoonotic Disease (other): SARS

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Other Projection Model/Methodology

Other Projection Model/Methodology: Emergence of infectious diseases

Resource Type:

format or standard characteristic of resource

Research Article, Review

Timescale:

time period studied

Time Scale Unspecified